Chiroptical activity from lanthanide(III)-based coordination compounds

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Circularly Polarized Luminescence (CPL) is gaining increasing interest in materials chemistry and physics thanks to the broad range of possible biological [1] and technological applications,[2] including the design of chiroptical phosphors for CPL-microscopy [3] and for CPL security devices or inks.[4] CPL activity in the visible spectral region is usually obtained in the case of luminescent Ln(III) complexes [Ln = Tb (in the green) and Eu (in the red)] containing a non-racemic chiral ligand. CPL activity can be also obtained thanks to the presence of metal complexes on the surface of inorganic nanoparticles.[5] In this contribution, we present the synthesis and the spectroscopic investigation of two classes of materials exhibiting CPL activity in the visible spectral region. The first class is constituted by nanocrystals of inorganic enantiomorphic trigonal phosphates (members of the $Tb_{1-x}Eu_xPO_4 \cdot 0.67H_2O$ (with x = 0, 0.005, 0.01, 0.05, 0.1 and 1) solid solution) capped on the surface with dipicolinate achiral organic ligand; whilst the second one is represented by chiral Tb(III)- and Eu(III)-based coordination compounds [6] (Fig. 1). These materials can be considered good candidates for advanced chiroptical applications.

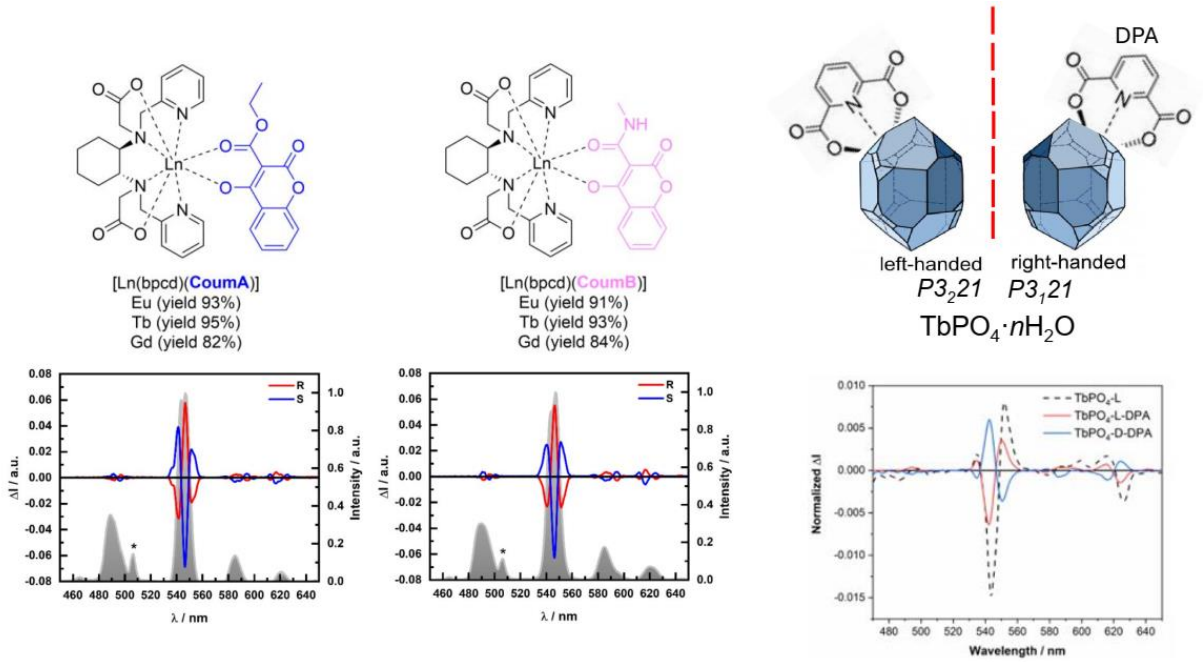

Fig. 1. Total and CP luminescence spectra of some materials discussed in this contribution.

References

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